BURROW PATTERN OF INDIAN METAD *MILLARDIA (RATTUS) MELTADA* GRAY[1]

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(*With one text-figure*)

Key words: Burrow pattern, *Millardia meltada*, brood chamber, emergency openings, hoarding behaviour, bolt run

Burrow pattern in *Millardia* (*Rattus*) *meltada* Gray was studied by excavating ten burrows every alternate month in 1992. Measurements of the burrows were recorded and found to be as follows: average length 106.2 cm, breadth 45.8 cm, depth 38.1 cm and diameter of burrow openings 3.6 cm. The average number of brood chambers (1.13), food chambers (1.13), surface openings (2.73), emergency openings (0.78), and rats (3.17), per burrow, were also noted. Hoarding behaviour was studied by collecting food materials, the average being 50.12 gm per burrow. *M. meltada* was found to have a very simple burrow structure with no boltruns. A hole covered with a thin layer of soil at the distal end was used during emergency. The burrows had one to four openings at the surface, with a heap of excavated soil near one of the openings. The burrows were deeper in summer than in winter.

Introduction

Rats are unwelcome associates of mankind from time immemorial. They cause enormous losses to agricultural crops at every stage, from production to consumption. According to one estimate, rats inflict damage of 6 to 10% on standing crops and 5 to 15% in storage (Jain and Tripathi, 1988). Besides feeding voraciously, they contaminate the food material with their droppings, urine and hair. Rats are carriers of many diseases that afflict humans and domestic animals.

Most of the rat species construct burrows and thus threaten conservation work. The Indian desert gerbil, *Meriones hurrianae* (Jerdon) unearths about 17,000 kg soil per hectare, which is blown away by strong wind, increasing the area of sandy waste and barren land (Prakash, 1976). Little information is available on the burrow pattern in different rat species, which is of importance in rodent pest management. Hence, the present study was undertaken.

[1]Accepted February, 1999

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Study Area

The burrow pattern of Indian metad, *Millardia (Rattus) meltada* was studied by digging burrows on five agricultural research farms viz. Students Research Farm, Research Farm, Oilseed Research Farm, New Dairy Farm and Vegetable Research Farm of this University and five villages viz. Gangpur, Gambhirpur, Prempur, Singhpur and Bairy-Akbarpur located in the development block Kalyanpur, Kanpur Nagar (U.P.). Most of the study area was under various cropping system. The main crops grown were cereals, pulses, oilseeds and vegetables.

Material and Methods

The test species was identified at the Zoological Survey of India, Calcutta. Burrows of *Millardia meltada* were unearthed in 1992 and ten burrows studied in alternate months. The morphometrics of the burrows, i.e. their openings, length, breadth, depth and number of internal structures, like brood chambers, storage/ food chambers, boltruns, escape holes (emergency openings), number of animals and quantity of hoarded material were recorded. The

burrows generally had 1-4 openings on the burrow surface. Live burrows were identified by closing them in the evening and examining them the next day. Open burrows with freshly excavated soil were considered live. Atmospheric temperature, relative humidity and rainfall were recorded to correlate the burrowing pattern with the meteorological conditions.

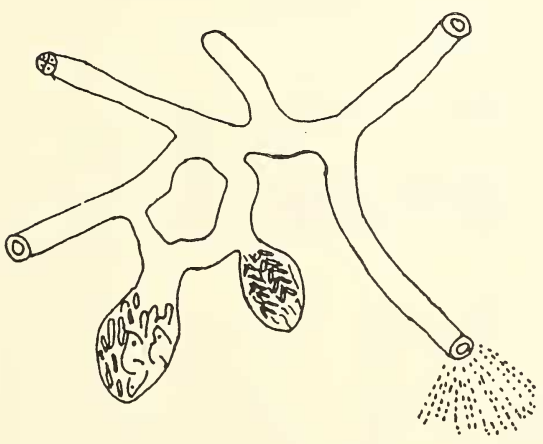
Results and Discussion

The structure of a *M. meltada* burrow is depicted in Fig. 1 and its measurements are presented in Table 1. The average length, breadth, depth and diameter of burrow openings were 106.2 cm, 45.8 cm, 38.1 cm and 3.6 cm respectively. The average number of brood chambers (1.13), food chambers (1.13), surface openings (2.73), emergency openings (0.78) and metads (3.17) were noted. The hoarded food material (average 50.12 gm per burrow) was generally present in the channels of the burrows; specialised food chambers were also noted in some cases. No boltruns were recorded in any burrow.

M. meltada made very simple burrows with a depth of 32.7 to 47.5 cm. The length and breadth ranged from 89.1 to 124.9 cm and 32.9 to 68.3 cm, respectively. The burrows had one to four clear openings and a heap of soil near one of them. Females lived with young ones in a burrow during parturition. The litters formed separate burrows when they could move and feed freely. Solitary females were found with an average of 2.7 young ones in a burrow. Females were observed placing smooth grasses in the brood chambers.

There were no boltruns in the burrow channels. Interestingly, in some cases the long, upwardly directed branches of the burrow channels ended in a very thin layer of soil at the surface. The metads were observed running out suddenly from these burrows by removing the thin soil layer in one stroke. These structures formed emergency openings or escape holes. Escape holes were observed in some burrows with an average of 0.78 escape holes per burrow.

The burrows were deeper during the summer, the mean depth being 40.6 cm in April and 47.5 cm in June and comparatively shallow during the winter (33.8 cm and 32.7 cm in



	Surface opening
	Emergency opening
	Brood chamber
	Food chamber
	Heap of excavated soil

Fig. 1: Burrow pattern of *Millardia* (*Rattus*) *meltada* Gray

TABLE 1
BURROW STRUCTURE OF THE INDIAN METAD, *MILLARDIA (RATTUS) MELTADA* GRAY

Months	External appearance of burrow	No. of burrows dug	Mean length of burrow (cm)	Mean breadth of burrow (cm)	Mean depth of burrow (cm)	Mean diameter burrow openings (cm)	Mean No. of brood chambers	Mean No. of food chambers	Mean No. of surface opening	Mean No. of rat\burrow	Mean No. of boltrun/ burrow	Mean No. of escape holes	Mean quantity of hoarded materials (gm)
February	Clearly opened burows	10	113.6	54.4	34.0	3.60	1.3	1.1	2.8	2.8	Nil	0.6	53.0
April	"	10	121.0	32.9	40.6	3.70	1.4	1.2	2.9	4.3	Nil	0.9	58.9
June	"	10	124.9	34.6	47.5	3.58	1.1	1.2	2.6	2.5	Nil	0.7	47.6
August	"	10	89.1	54.6	39.9	3.50	0.8	1.0	2.5	2.4	Nil	0.8	33.5
October	"	10	90.6	68.3	33.8	3.35	1.0	1.1	2.8	2.1	Nil	0.7	60.2
December	"	10	118.9	61.8	32.7	3.43	1.2	1.2	2.8	4.9	Nil	1.0	47.5
Average			106.2	45.8	38.1	3.6	1.13	1.13	2.73	3.17	—	0.78	50.12
S.D.			15.79	14.40	5.69	0.12	0.21	0.08	0.15	0.14	—	0.17	9.7
S.E.±			6.44	5.87	2.32	0.05	0.08	0.03	0.06	0.46	—	0.06	3.9

October and December, respectively). The mean atmospheric temperature during 1992 was 33.98 °C in June and 16.34 °C in December.

The length of the burrow was maximum during the summer (mean 124.9 cm in June) and minimum in the monsoon (mean 89.1 cm in August). During the winter, the burrow length was high (mean 118.9 cm in December). The breadth was highest in October (mean 68.3 cm) and lowest in April (mean 32.9 cm).

The length, breadth, depth and surface openings found in this study are in accordance with those reported by Chopra and Sood (1980), but they have reported the presence of boltruns and absence of brood chambers, contrary to our observations.

In *R. meltada pallidior*, Rana and Prakash (1980) reported 3-6 surface openings and 3-5 boltruns per burrow system, while in the present study, the mean number of surface openings were 2.73 with no boltruns.

Similar morphometric studies of *Bandicota bengalensis* burrows were done by Sagar and Bindra (1968), and Sood and Gill (1978). Likewise, Prakash (1981) made burrow measurements of *Meriones hurrianae*, *Tatera indica* and *Gerbillus gleadowi* in Rajasthan. Bhadauria (1992) studied burrow patterns of *Bandicota bengalensis* and *Tatera indica* and reported measurements of similar surface openings, bolt runs etc., which are in accordance with our data.

ACKNOWLEDGEMENT

We thank the Vice Chancellor, C.S. Azad University of Agriculture and Technology, Kanpur for facilities.

REFERENCES

BHADAURIA, A.S. (1992): Studies on bio-ecology and management of Indian Gerbil, (*Tatera indica indica* Hardwicke) and Bandicoot rat (*Bandicota bengalensis* Gray) in central U.P., Ph.D. Dissertation, C.S. Azad University of Agriculture and Technology, Kanpur 208 002.

CHOPRA, G. & M.L. SOOD (1980): Burrow behaviour of soft furred field rat, *Rattus meltada* Gray. *Rodent Newsletter 6(2)*: 9-10.

JAIN, A.P. & R.S. TRIPATHI (1988): Chuha Prabandh, C.A.Z.R.I. Monograph No. 35, Central Arid Zone Research Institute, Jodhpur, pp. 1-24.

PRAKASH, I. (1976): Rodent pest management: principles and practices, C.A.Z.R.I. Monograph No. 4, Central Arid Zone Research Institute, Jodhpur, pp. 1-28.

PRAKASH, I. (1981): Behavioural patterns — Home range ecology of the Indian Desert Gerbil, *Meriones hurrianae*. C.A.Z.R.I. Monograph No. 10, Central Arid Zone Research Institute, Jodhpur, pp. 40-41.

RANA, B.D. & I. PRAKASH (1980): Burrow system of *Rattus meltada pallidior* in South-Eastern Rajasthan, *Proc. All India Workshop on Rodent Research and Training*, U.A.S., Bangalore: 15-16.

SAGAR, P. & O.S. BINDRA (1968): A note on the burrowing pattern of Lesser Bandicoot, *Bandicota bengalensis* Gray in Punjab. *Proc. Int. Symp. on Bionomics and Control of Rodents*. Kanpur, pp. 55-56.

SOOD, M.L. & R.P.S. GILL (1978): Burrowing pattern *Proc. Workshop Rodent Research*, Central Arid Zone Research Institute, Jodhpur, pp 8-10.

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